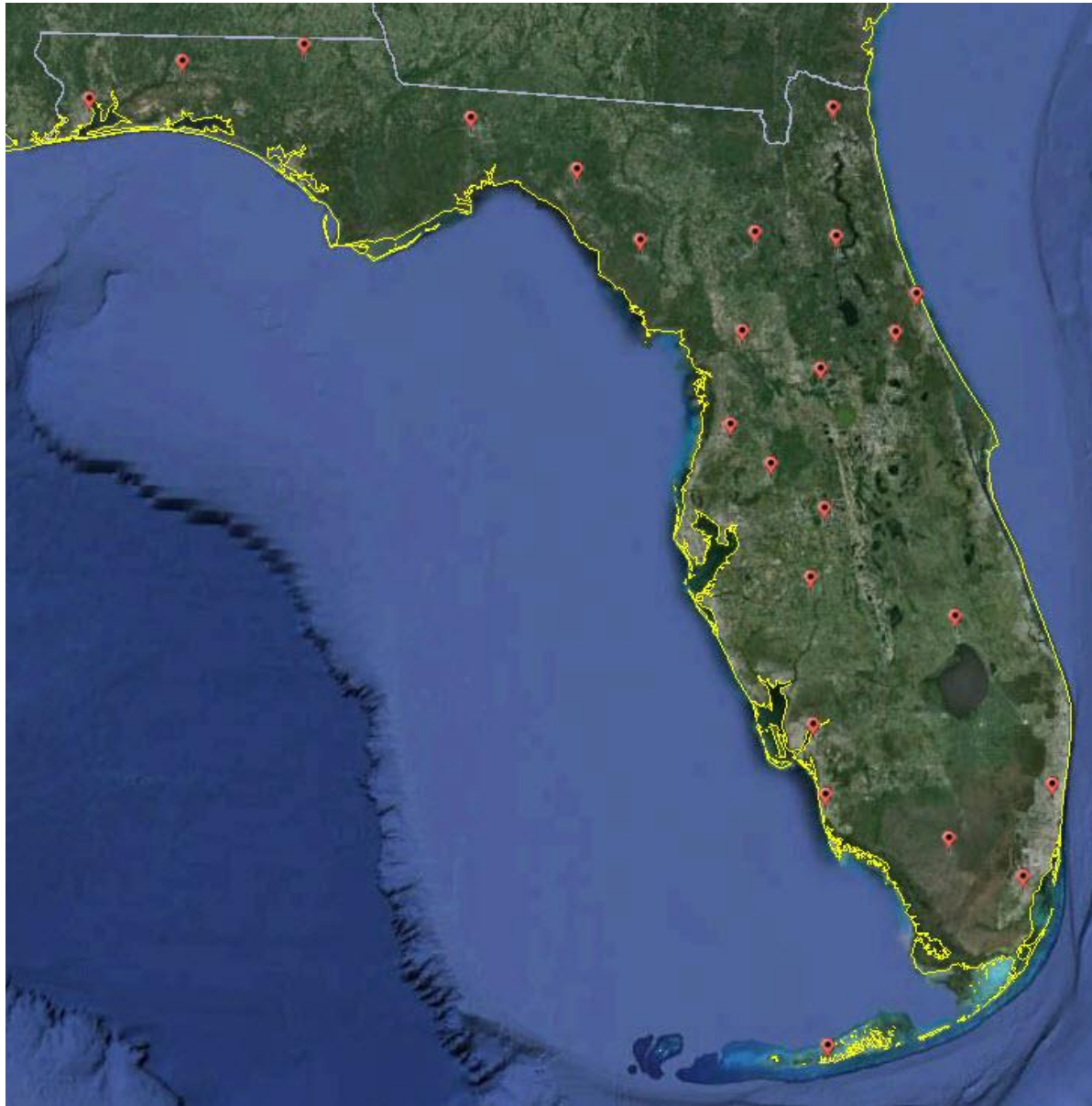


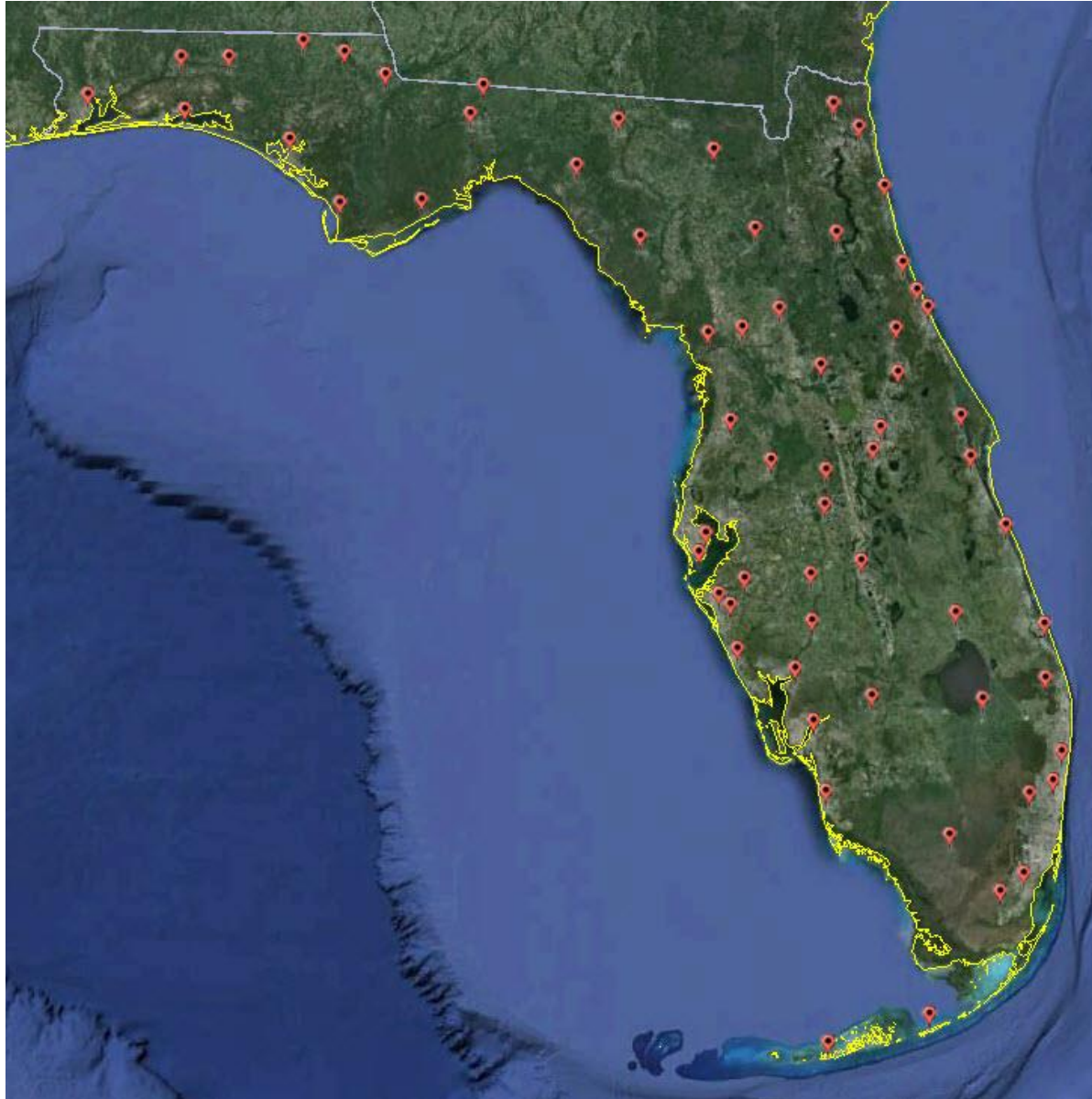
# ***Florida Permanent Reference Network***

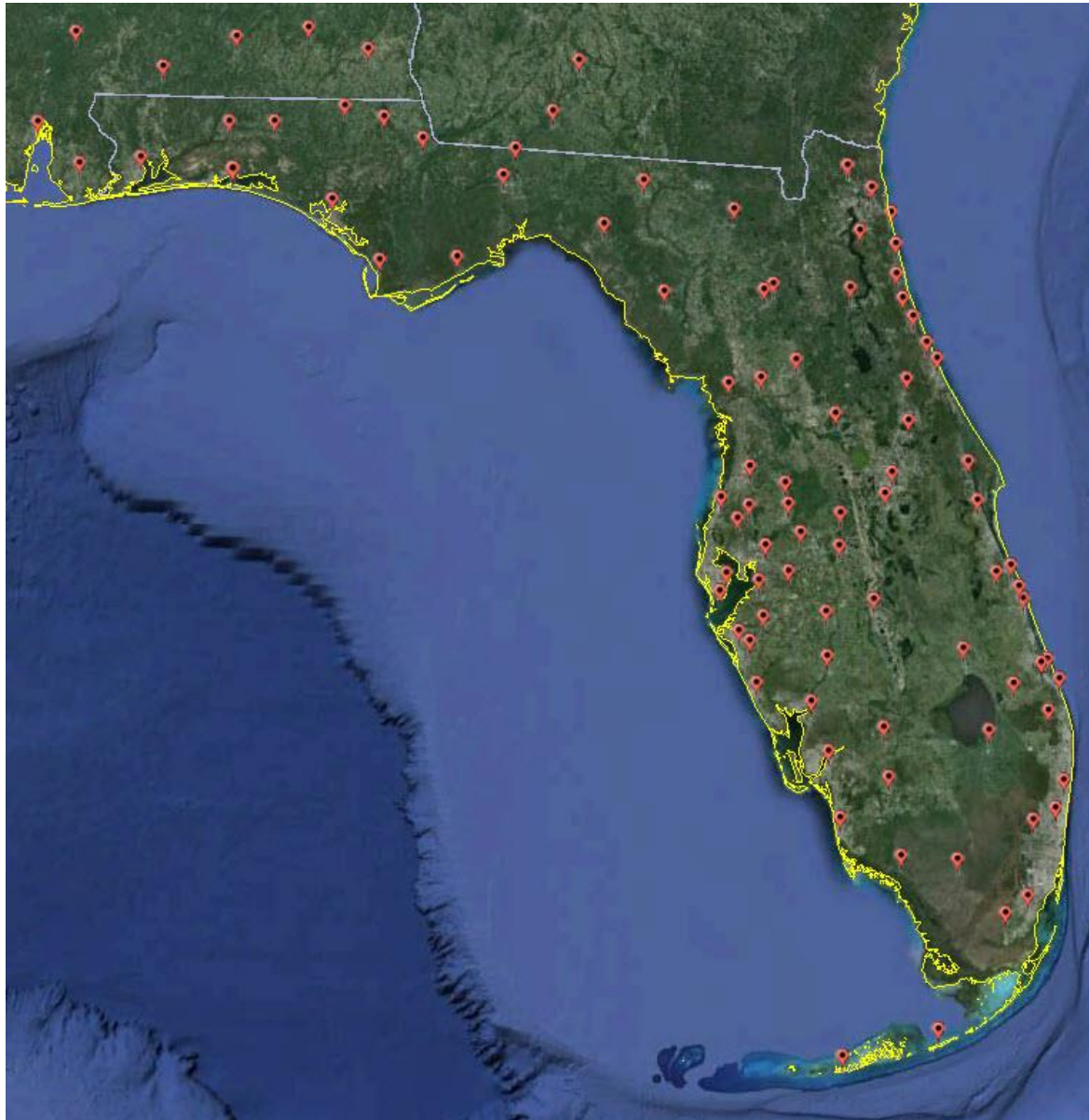


**Today and Tomorrow**

**Speaker: Ron Hanson**







# *Important FPRN Information*

204.90.21.205

~~www.myfloridagps.com~~

www.dot.state.fl.us/surveyingandmapping/FPRN



# New *FPRN* Web Site

- Maps
  - Dynamic Site Status
    - FDOT Enterprise GIS foundation
  - Google Earth Overlay
- Computation Service
  - OPUS utilizes 32 sites
  - *FPRN* utilizes 93 sites
- Rinex Availability
  - NGS/CORS provides data for 32 sites
  - *FPRN* provides data for 93 sites

The screenshot shows the FDOT Florida Department of Transportation website. The header includes the FDOT logo, the text "Florida Department of TRANSPORTATION", and links for "E-Updates | FL511 | Mobile | Site Map". A search bar is also present. The main navigation menu includes "Home", "About FDOT", "Contact Us", "Maps & Data", "Offices", "Performance", and "Projects". The "Maps & Data" menu is expanded, showing "Surveying & Mapping". Below this, a banner for the "Florida Permanent Reference Network (FPRN)" is displayed. The main content area is titled "Welcome to the FPRN" and contains a paragraph about the network. It then lists four categories: "Maps" (with a globe icon), "Services" (with a gear icon), "Registration" (with a people icon), and "Customer Service" (with a life preserver icon). Each category has a list of links. The footer includes a navigation bar with "Contact Us", "Employment", "MyFlorida.com", "Performance", "Statement of Agency", and "Web Policies & Notices". Below this is a social media bar with icons for Facebook, Twitter, YouTube, WordPress, and RSS. The bottom right corner contains the text "Florida Department of Transportation" and "Constant. Predictable. Repeatable."

FDOT Florida Department of TRANSPORTATION

E-Updates | FL511 | Mobile | Site Map

Search FDOT...

Home About FDOT Contact Us Maps & Data Offices Performance Projects

Surveying & Mapping

Surveying & Mapping Office / Programs & Services / FPRN

Florida Permanent Reference Network (FPRN)

Welcome to the FPRN

Together with our Cooperative Agencies the FPRN network consists of nearly 100 Continuously Operating Reference Stations (CORS) located throughout Florida. We work closely with the National Geodetic Survey's National CORS network. Each CORS site provides Global Positioning System (GPS) carrier phase and code range measurements in support of 3-dimensional positioning activities throughout Florida and surrounding states.

**Maps**  
View Dynamic Map with station status or  
Download Google Earth overlay.

**Services**  
RINEX  
Login to Rinex  
Create new Rinex Download or  
Manage existing Rinex jobs  
Computation Service  
Submit data for computation  
Bridge Monitoring  
Dames Point Bridge  
Sunshine Skyway Bridge

**Registration**  
Registration Steps  
New User Registration  
Maintain Existing Users Profile  
Forgotten Password

**Customer Service**  
FPRN Products  
Listing of Current FPRN Real-Time Products  
FPRN FAQ  
Frequently Asked Questions  
Technical Support  
Download Instruction manuals for rover configuration  
Live Support Option  
Live Support Options

Contact Us Employment MyFlorida.com Performance Statement of Agency Web Policies & Notices

Facebook Twitter YouTube WordPress RSS

Florida Department of Transportation  
Constant. Predictable. Repeatable.

# Supported Languages

- **RTCM 2.x**
  - Used for RTK
  - Includes NRTK
  - Includes GLONASS
  - Ideal for Legacy Sensors
- **CMR(+)**
  - Used for RTK
  - Includes NRTK
  - More efficient than RTCM 2.x
  - Only for GPS
  - GLONASS extension still proprietary
- **RTCM 3.x**
  - Used for RTK
  - Includes NRTK
  - Includes GLONASS
  - More efficient than RTCM 2.x
  - Lower bandwidth than CMR(+)

# *Supported Protocols*

- **NTRIP**

- Multiple languages per port
- Multiple products per port
- Works with NRTK
- Works with Automatic Nearest
- Works with Zones

- **TCP/IP**

- One language per port
- One product per port
- Works with NRTK
- Works with Automatic Nearest



# *FPRN Products*

- Single Baseline
  - Direct Connect (TCP/IP)
  - State Wide (NTRIP)
  - District Wide (NTRIP)
- Network Solutions
  - Automatic Nearest
  - FKP
  - MAX
  - VRS
- GIS Corrections

# *Port Schema*

## Port 10000 - Network Solutions (NTRIP)

iMAX                      Max                      Nearest                      FKP                      VRS

## 11000 series – Network Solutions (TCP/IP)

iMAX                      Max                      Nearest                      FKP                      VRS

## Port 10800 – GIS Solutions

Panhandle                      North                      Central                      South

# *Port Schema*

## **ABCDE**

AB - Language

23 – RTCM 2.3

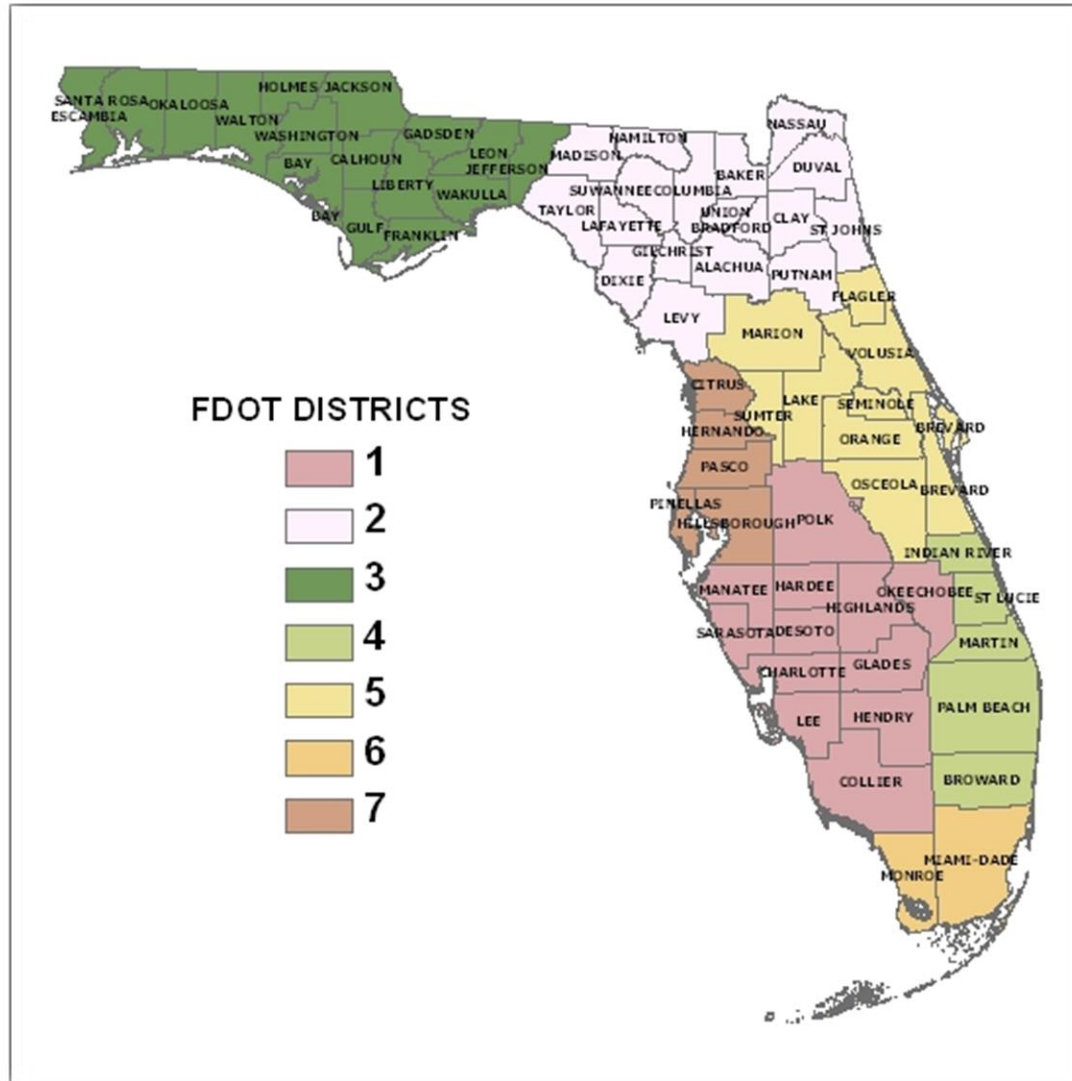
25 – CMR+

31 – RTCM 3.1

C – District

DE – Station Designation

# Zones / Districts



# Stations

## TCP/IP RT Ports

Port	Protocol	Language	Product
23XYZ	TCP	RTCM 2.x	Station Single Baseline
25XYZ	TCP	CMR+	Station Single Baseline
31XYZ	TCP	RTCM 3.x	Station Single Baseline

X = FDOT District Number  
YZ = Station Number (See Station Designation Below)

## District 4 Port Designation

Site Name	Station # (YZ)	City
BOCA	01	Boca Raton
FTLD	02	Davie
GLAD	03	Belle Glade
LAUD	04	Ft Lauderdale
PBCH	05	West Palm
SBST	06	Sebastian
STEW	07	Stuart
IRC1	51	Florida Ridge
IRC2	52	Gifford
IRC3	53	Fellsmere
MRT1	54	Indiantown
MRT2	55	Palm City

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# Stations

## TCP/IP RT Ports

Port	Protocol	Language	Product
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25XYZ	TCP	CMR+	Station Single Baseline
31XYZ	TCP	RTCM 3.x	Station Single Baseline

X = FDOT District Number  
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STEW	07	Stuart
IRC1	51	Florida Ridge
IRC2	52	Gifford
IRC3	53	Fellsmere
MRT1	54	Indiantown
MRT2	55	Palm City

204.90.21.205:31406



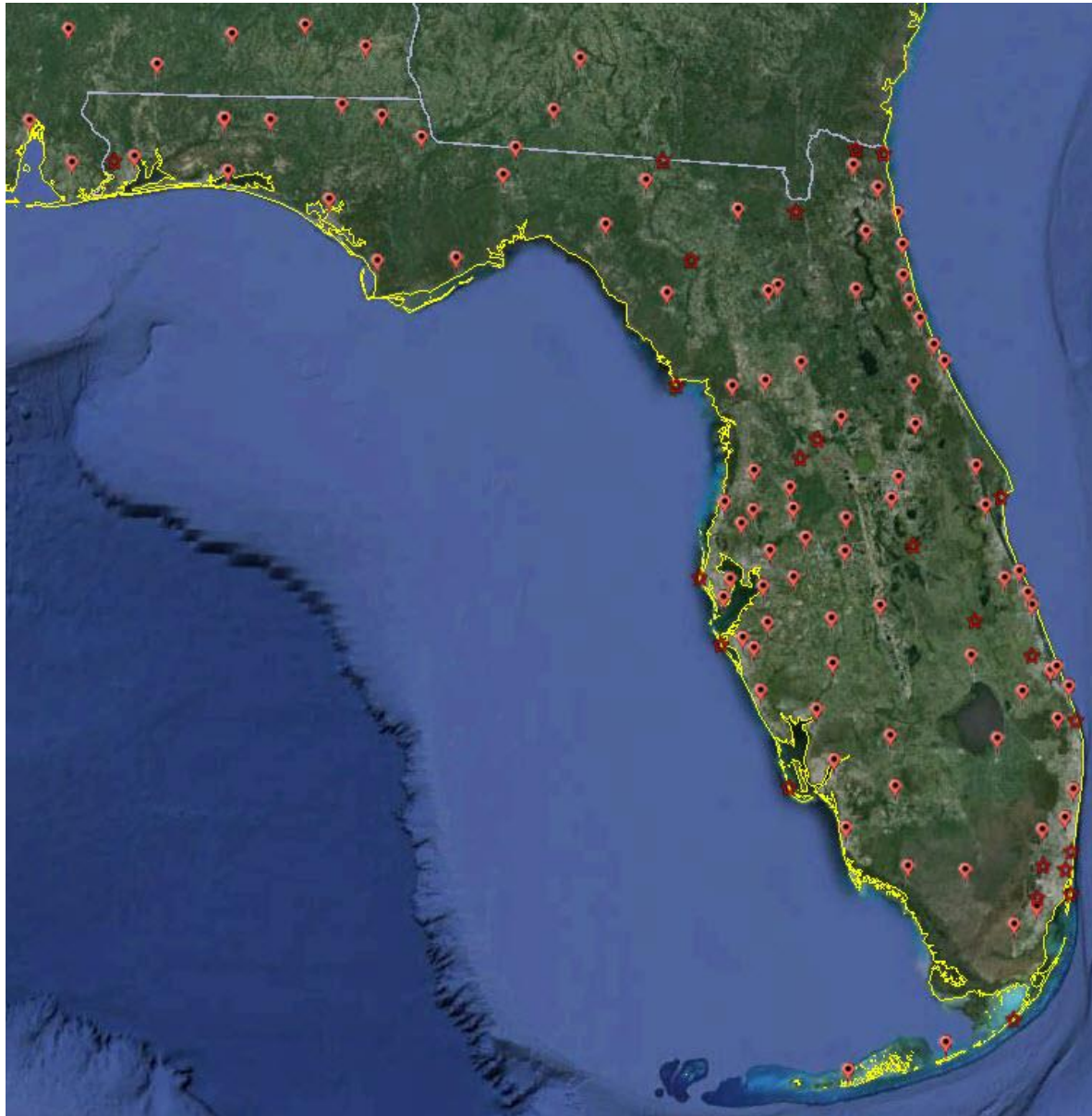
# *Hardware Improvements*

- Server Migration
  - Moved **FPRN** Servers to High Availability Network
- Station Upgrades
  - Upgraded to provide GLONASS
- Communication Upgrades
  - Upgrading from analog to digital

# *Scheduled Network Improvements*

- Coordinate Adjustment
  - Adjusting coordinates to match NSRS - NAD 83 – 2011 (epoch 2010.00)
- Height Modernization
  - Obtaining precise ellipsoid heights for each station
- Station Densification
  - Adding new stations to eliminate “gaps” in coverage
  - Partner Agencies using FDOT “surplus equipment”





# *Network Limitations*

- Only as strong as weakest link
  - GPS only in some areas
- Outside Network?
  - No Network Solution

# Support

[www.dot.state.fl.us/surveyingandmapping/fprn.shtm](http://www.dot.state.fl.us/surveyingandmapping/fprn.shtm)

- Ron Hanson (Tuesday – Saturday)
  - (850) 414-4254 Office
  - (850) 510-8596 Cell
  - ronald.hanson@dot.state.fl.us
- Scott Harper (Sunday – Thursday)
  - (850) 414-4596 Office
  - (850) 728-1240 Cell
  - scott.harper@dot.state.fl.us